Xerantica tephroclysta Meyrick, 1930 (Tineidae), a new member of the Palaearctic fauna, with description of its life history and early stages

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Abstract. Numerous specimens of a tineid species were reared from larvae found in the stems of *Capparis spinosa* in Morocco. It has been determined as *Xerantica tephroclysta* Meyrick, 1930, the first record of this species from the Palaearctic region. Larva, pupa and adult are described together with the male and female genitalia, and the systematic position of the genus is discussed.

Zusammenfassung. Aus Larven, die im Stamm von *Capparis spinosa* in Marokko gefunden wurden, konnten zahlreiche Falter einer Tineide gezogen werden, die als *Xerantica tephroclysta* Meyrick, 1930 determiniert wurde. Es handelt sich hierbei um den Erstnachweis dieser Art für die paläarktische Fauna. Es wird eine Redeskription des Falters sowie eine erstmalige Beschreibung der männlichen und weiblichen Genitalien gegeben. Die systematische Stellung der Art im System der Tineidae wird diskutiert.

K e y w o r d s . Lepidoptera; Tineidae; *Xerantica*; *Capparis*; palaearctic; Atlas Mountains.

Introduction

At the end of February 2004 Rolf Bläsius examined capers (*Capparis spinosa*, Capparidaceae) growing on the roadside cliffs of the southern slopes of Tizi-n-Test, south-west Morocco (Fig. 1). The stem base of one caper was riddled with holes and these holes spun with silvery threads mixed with expelled frass. The stem-base was malformed and appeared to have been subject to fungal attack. When the stem was cut open it was found to contain several whitish larvae. Examination of the larval prolegs showed they were not the expected Sesiidae, and in early summer of the same year, specimens of Tineidae emerged. On 18 May 2005, in the same locality, more *Capparis* was sampled and, as in the previous year, numerous moths emerged, a total of 48 specimens. Capers examined on the northern slopes of the High Atlas near Asni and Demnate did not show any trace of infestation.

The vegetation of the southern slopes of Tizi-n-Test suffers from heavy grazing. The capers on the cliffs are out of reach, however. In winter, snow sometimes reaches as low as the collecting-locality (1500 m) and on 23 February 2004, the snow line was at 1800 meters. In the dry period, coastal mists often envelop the roadside cliffs bringing considerable humidity.

Tizi-n-Test on the southern slope of the High Atlas, is a remarkable locality where the terrain rises from 300 m in the Sous Valley to 3600 m on the peaks to the north-west and to over 4000 m in the north-east. The Sous Valley divides the mass of the African continent (and the comparatively low Anti Atlas) from the folds of the High Atlas.

Fig. 1. Moroccan biotope of *Xerantica* with *Capparis spinosa*.

The tineid reared from *Capparis* was unfamiliar within the Palaearctic context and was eventually submitted to GSR who identified it by comparison with specimens in the Natural History Museum, London (BMNH), as *Xerantica tephroclysta* Meyrick. *Xerantica* is a monobasic genus. *X. tephroclysta* was described by Meyrick (1930) from a single male specimen from Uganda and it has never hitherto been illustrated; Gozmány & Vári (1973: 183) listed *Xerantica* among their "taxa incertae sedis" and noted that "The holotype has lost its abdomen ... the species may belong to the Hapsiferinae". Robinson (2001, 2005) placed *Xerantica* in the Tineinae.

The purpose of this paper is to draw attention to this large and colourful tineid, record its first occurrence in the Palaearctic region, note its biology, and provide an illustrated redescription that includes early stages and adult genitalia.

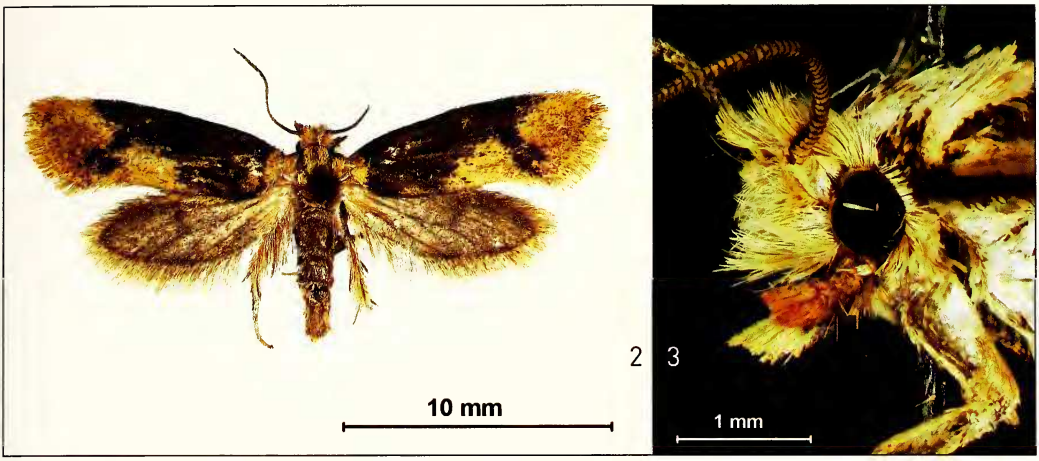
Its occurrence in North Africa raises the question whether it may have crossed the Mediterranean and may be found, for example, in *Capparis* vegetation in south-eastern Spain.

Xerantica Meyrick, 1930: 553

Type-species: *Xerantica tephroclysta* Meyrick, 1930, by monotypy.

Xerantica tephroclysta Meyrick, 1930: 553

Material. Holotype (Fig. 10) ♀ [not ♂ as stated by Meyrick], **Uganda**: Madi, v.1927 (G.D.H. Carpenter) [abdomen missing] (BMNH). – (A) tropical West Africa (BMNH) (3♂): 1♂, N. **Nigeria**: Zaria, Samaru, 10.x.1975 (J.C. Deeming) (genitalia slide no. 1353; BMNH); 1♂, similar data but 15.–22.vi.1970 (P.H. Ward) (BMNH); 1♂, S. Nigeria: U[niversity] C[ollege] Ibadan, 19.iv.1958 (H.J. Sutton) [abdomen missing] (BMNH). (B) North Africa (48+ adult specimens, 1 larva, 3♂ and 2♀ pupal exuviae): **Morocco**, Haute Atlas, Tizi-n-Test, larvae in *Capparis spinosa*, e.l. 17.vi.–18.vii.2004 and 10.vi.–18.vii.2005 (R. Bläsius); specimens are in the following collections: E. Bettag (Dudenhofen), R. Bläsius (Eppelheim), D. Bartsch (Stuttgart), DEI (Müncheberg), BMNH (London).



Figs. 2–3. *Xerantica tephroclysta*. **2.** Adult. **3.** Adult head.

Description

Imago (Figs. 2–3). Wingspan. 14–22 mm. Coloration. Head and palpi yellow ochre, underside of palpi with some darker scales; tegulae and thorax with similar coloration, tegulae at base and thorax in first half overlaid with fuscous scales; fore- and mid-legs fuscous, the ends of the legs ochreous yellow, posterior legs fuscous only on outer surface, posterior tibiae with long dense scales. Ground colour of forewing yellow-ochre, dusted with darker greyish scales, especially towards apex, and with conspicuous rhomboidal blackish brown patch extending from costa to posterior margin and extending in a broad, irregular streak towards tornus; extent of dark patch somewhat variable; with small scattered groups of 4–10 raised scales especially in distal and posterior areas; cilia dull yellow. Hindwings grey, cilia pale yellow.
Head. Eye moderate, interocular index: 1.0. Epicranial suture strongly developed. Occiput with transverse band (divided medially by narrow, scale-free area) of erect piliform scales forming a pair of whorls; scale-bases of each whorl traversed by oblique scale-free line, with few scale-bases anterior to the line; occipital suture well developed. Vertex with scaling similar to occiput forming untidy whorls and tufts. Frons with similar scaling; transfrontal sulcus present, broad; scaled medial area oval, one-third width of frons; scale-bases forming a continuous U-shaped field adjacent to margins of eyes and across lower half of frons. Pilifers triangular, conspicuous, with elongate medially-directed yellow scales. Mandible rudiment large and conspicuous, club-shaped. Maxillary palpus small, short and inconspicuous, elongately conical, probably three-segmented [description based on denuded head – head preparation not made]. Galea not visible, possibly rudimentary or absent. Labial palpus ~1.5× height of head, second segment with at least six or seven lateral bristles and a sparse terminal (dorsal) whorl of seven or eight bristles. Antenna reaching 0.75× length of forewing; scape with pecten of at least 15 stout bristles; flagellar segments each completely covered by one row of narrow, elongate appressed scales; cilia in male ~0.75× flagellar diameter, but most of this length obscured by scales, in female shorter and more sparse.

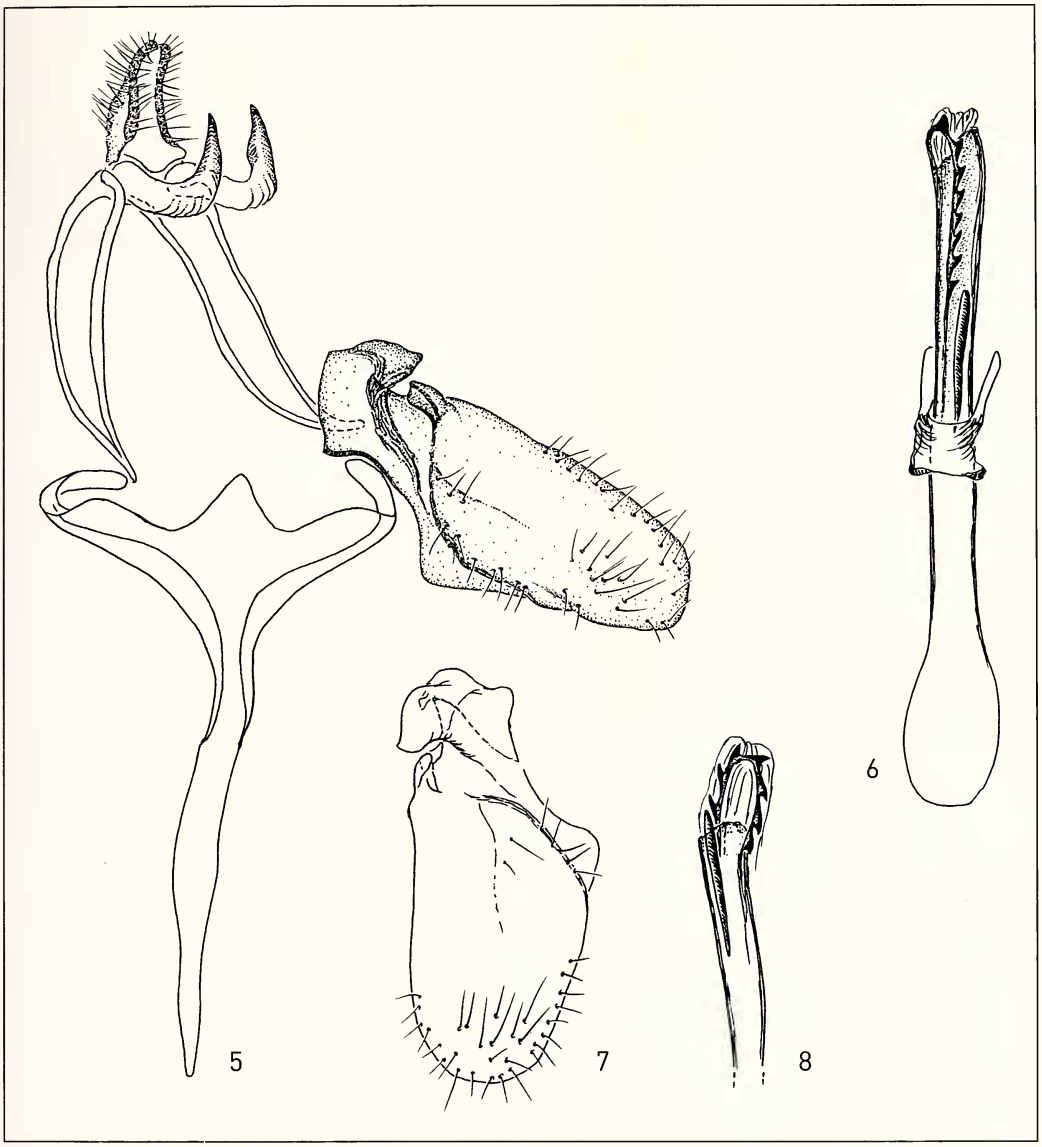
Fig. 4. Pupa protruded from the stem of *Capparis spinosa*.

Thorax. Forewing index: 0.30; hindwing index: 0.38. Retinaculum in male absent, but base of Sc swollen. Forewing with all veins present and unmodified; R5 to apex; cell 0.55× length of forewing, with traces of chorda and (?)unbranched M [venation description based on superficial examination]. Hindwing of male with frenulum of one very stout, thick composite bristle comprised of numerous acanthae fused but distinct for their entire length; female frenulum similar but larger and flatter with oblique apex; cell 0.6× length of wing, containing well developed branched M; all other veins present and unmodified, strong 3A present.

Pregenital abdomen. Unremarkable, without specialized structures; apodemes broad-based, tapered and convergent, from truncated heart-shaped area occupying anterior half of S II; T I without sclerotization within frame, coincident with but probably not fused medially with T II; T II to T VII more strongly sclerotized anteriorly, trapezoidal, T VIII (male) elongately trapezoidal, as long as broad, more strongly sclerotized than preceding segments. Segments II and III with free dorsal sclerite close to spiracle, VIII without coremata in male.

Male genitalia (Figs. 5–8). Uncus broad at base, narrowing to blunt apex, the two uncus lobes appressed but clearly differentiated. Tegumen narrow, margins thickened, tapered towards vinculum. Gnathos arms strongly curved caudad, with acute apices, a short serrate length on inner surface of curve [in specimen from Nigeria]. Vinculum with triangular medial process; saccus elongate. Valva subovate with ridged protuberance bearing a shallow, lobate process at base of costa, and with ridge running from this parallel to anterior margin; apodeme broad, with subquadrate process directed ventrally [as seen *in situ*]. Phallus as long as saccus, with rounded base that is sclerotized only distally; with two cornuti, one thin and lanceolate, at one-half length of phallus when vesica is retracted, the other resembling a length of fretsaw blade with 7–9 teeth, straight and occupying caudal half of phallus when vesica retracted. Juxta very small, trapezoidal, with a pair of elongate posterior processes.

Female genitalia (Fig. 9). Eighth tergite shield-shaped, anterior margin rounded; ostium mushroom-shaped, together with the ductus bursae highly sclerotized, ductus merging gradually with corpus bursae; corpus with numerous small, irregular linear sclerotizations.



Figs. 5–8. *Xerantica tephroclysta*, male genitalia. **5.** Uncus-tegumen-vinculum-complex, one valva removed. **6.** Phallus. **7.** Valva separated. **8.** Tip of phallus with partly protruded vesica.

Larva (Figs. 11–12). [Described from a single damaged specimen, presumed to be of final instar, in which many setae are wholly or partially broken. A supernumerary (?pathological) AF seta is present on the left of the head.] Length ~18 mm; head capsule width 1.7 mm. Head strongly sclerotized but thoracic and abdominal segments with little or no sclerotization, though margins of pinacula are usually well-defined. Head with six small, poorly defined, shallowly convex pale stemmata. Ventral prolegs with ~28 crochets. Coxae well-separated with V1 distant from coxal plates. Spiracles nearly round, with those of prothorax and A8 slightly larger than anterior abdominal spiracles.

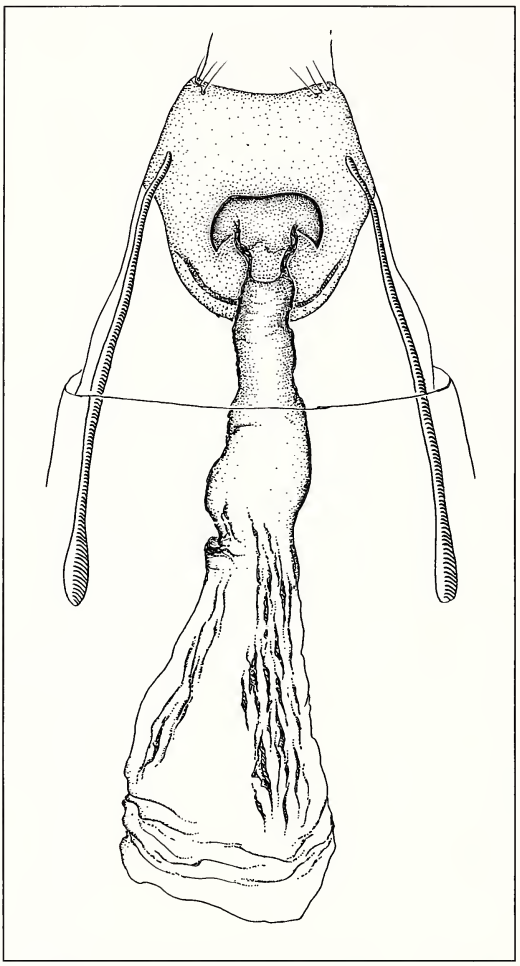


Fig. 9. *Xerantica tephroclysta*, female genitalia.

Chaetotaxy. Head with setae generally elongate, O2, A1 and SO3 reaching apex of mandible; AF2, AFa and AF1 roughly equidistant; V and P setae and pores roughly linear except for Pb which is almost level with P3; L1 well below A3. Prothorax with L group trisetose; SV setae in a horizontal line; XD2 and SD1 on the prothoracic plate. Mesothorax and metathorax with SV group unisetose. First abdominal segment with D2 setae more widely separated than D1 setae, and SD1 above SD2; L3 posterior to L2; SV2 vertically above SV1. Sixth abdominal segment with D1 setae more widely separated than D2 setae; SD2 dorsal to SD1 which is on common pinaculum with L1; L2 anterior to spiracle; SV group trisetose. Eighth abdominal segment with D2 setae slightly below D1; SD group unisetose with SD2 apparently absent; L1 posterior to spiracle; L3 level with L2; SV group bisetose. Ninth and tenth abdominal segments as illustrated.

Pupa (Figs. 4, 13–19). [Based on 3♂ and 2♀ exuviae.] Antennae almost reaching wing-tips; wing-tips reaching middle of fourth abdominal segment, hind legs reaching middle of fifth segment in both sexes. Facial plate comprised of eye-plates and frons with, posteriorly, galeae (centrally) and, laterally, short maxillary palpi reaching only one-half length of galeae; mandibular rudiment large, remaining attached to fore leg on eclosion. Anterior bands of transverse spines present on abdominal segments 3–8 in both sexes but represented by only a narrow, inconspicuous, rugose ridge on third segment; eighth segment in females with additional coarse rugosity anterior to band of spines; posterior band of spines (present in most tineid pupae) represented only by a thin, narrow, inconspicuous, denticular ridge on segments 3–7 in males and 3–6 in females; segments 9+10 rugose/spinose dorsally, ventrally with cremaster comprised of a pair of small, shallow, anteriorly-directed hooks surrounded by rugosity similar to but finer than that of dorsal region.

Distribution. Uganda; Nigeria; Morocco.

Life history. Larva feeding within stems of *Capparis spinosa* (see above).

Remarks. *Xerantica tephroclysta* is a conspicuous and distinctive species, and its superficial appearance is such that it cannot be confused with any other tineid known

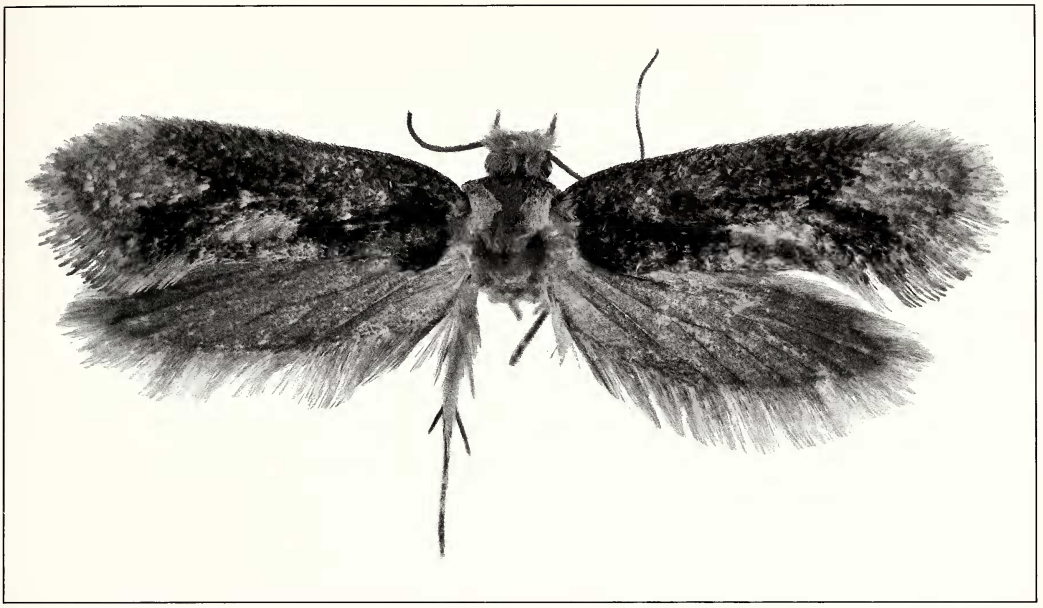


Fig. 10. Holotype female of *Xerantica tephroclysta*, Uganda.

to us. However, its systematic position is more of a puzzle. Superficially, adults bear some resemblance to large, pale Tineinae such as *Ceratophaga*. There are no significant derived characters apparent in the head structure or the wing venation, though the labial palpus has an apical whorl of bristles in addition to lateral bristles, a feature typical of Tineinae and several other groups. The frenulum is not markedly dimorphic between the sexes, being a very stout, thick composite bristle comprised of numerous acanthae fused but distinct for their entire length; the retinaculum is absent in the male. Comparable but not entirely similar frenular modifications are scattered throughout the Tineidae, for example *Coryptilum* (Myrmecozelinae) and *Edosa* (Perissomasticinae) (Robinson, submitted); in *Ceratophaga* (in which a retinaculum is present) the male frenulum is stout but with the acanthae entirely fused; in females the acanthae are fused to form a stout, sinuous spine and a smaller, slender accessory spine.

The structure of the uncus is strongly suggestive of tineine affiliations; the paired uncus lobes present in many Tineidae are more or less fused in Tineinae to form a single articulated hook. "The bilobed origin of the tineine uncus is invariably obvious, however, betrayed by a medial suture and, frequently, a distinctly (if minutely) bifid apex" (Robinson & Nielsen, 1993). In the case of *Xerantica* the lobes are distinct and the uncus structure is reminiscent of some species of *Acridotarsa*. There are no further features of the male or female genitalia to suggest positive associations with any non-tineine groups. It is much easier to exclude *Xerantica* from particular groups than to include it!

Absence of various adult synapomorphies precludes membership of most subfamilies, as they are currently defined, other than Tineinae. The saccus is not articulated, precluding membership of Siloscinae. Lack of a corethrogyne rules out most Myrme-

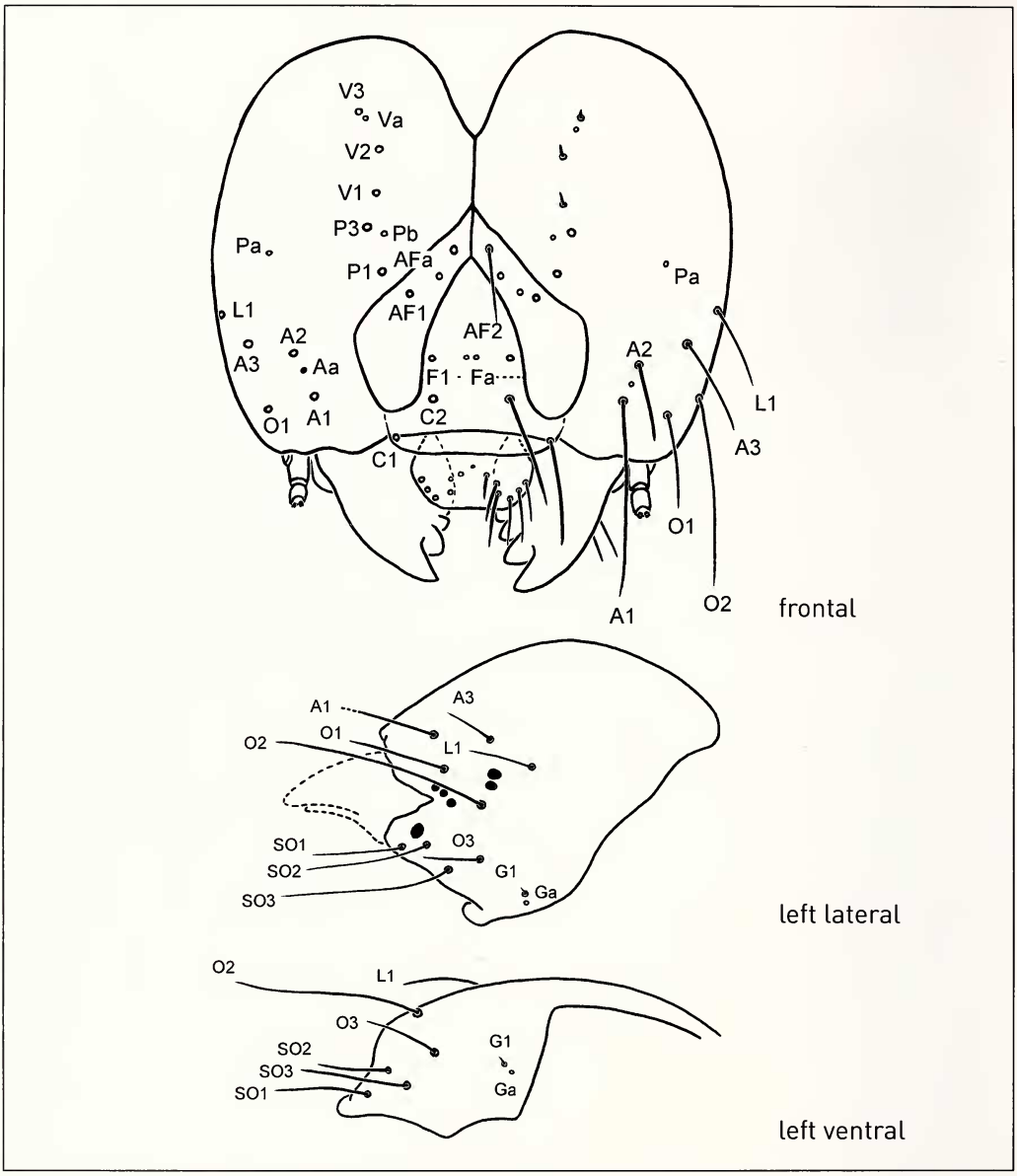


Fig. 11. Larval head of *Xerantica tephroclysta*: setal maps as frontal, left lateral and left ventral views.

cozeline subgroups (the subfamily itself is probably paraphyletic), Hapsiferinae and Perissomasticinae. The simple antenna precludes Euplocaminae. Lack of a piercing ovipositor rules out Teichobiinae. Symmetrical male and female genitalia rule out Dryadaulinae or Stathmopolitinae. Full wing venation and the antennal scaling pattern probably preclude membership of the Meessiinae, not a proven monophyletic group. Lack of any combination of the suites of synapomorphies for Setomorphinae, Nemapogoninae or Hieroxestinae noted by Robinson & Nielsen (1993) and Robinson &

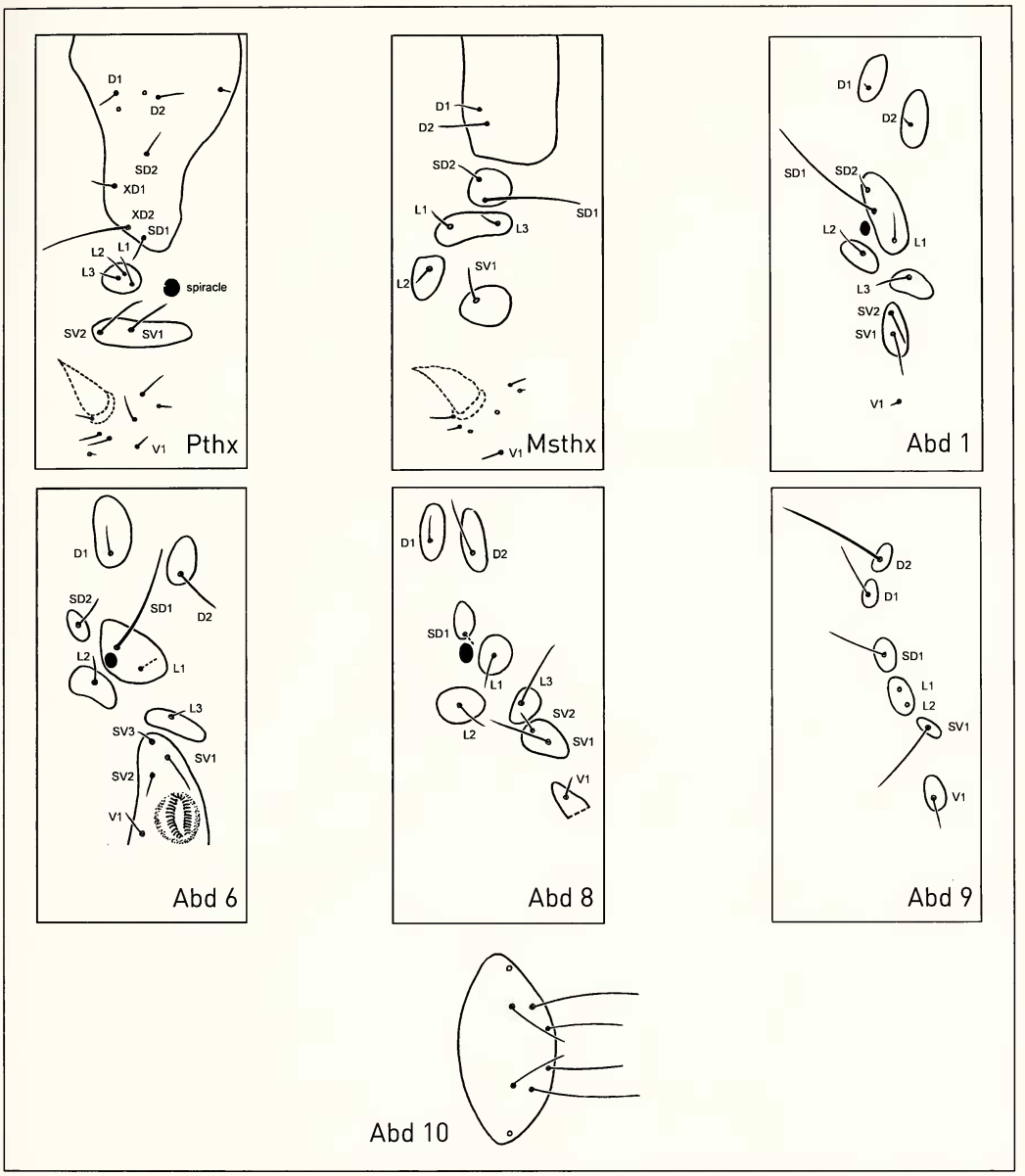
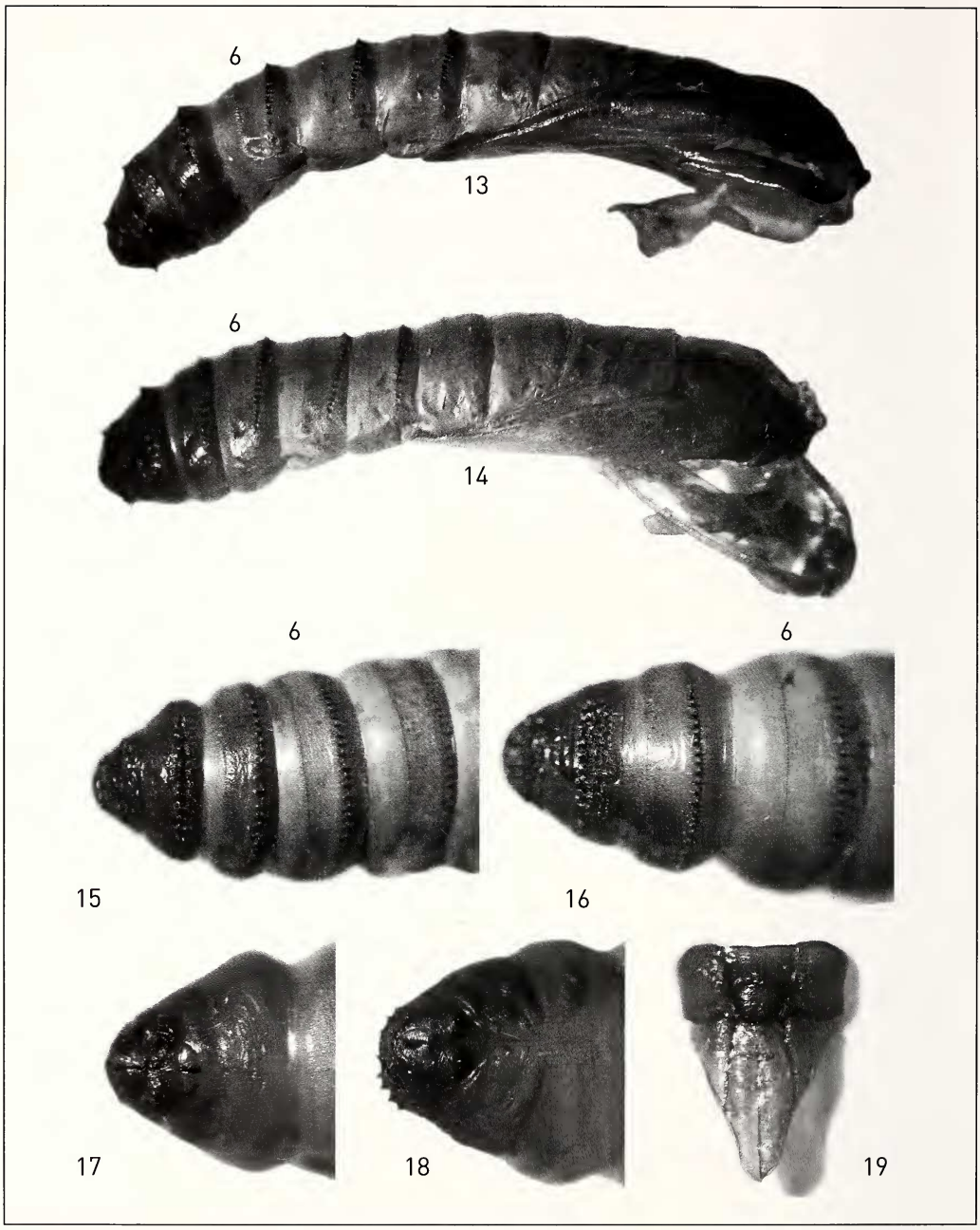


Fig. 12. Larva of *Xerantica tephroclysta*: setal maps of prothorax (Pthx), mesothorax (Msthx), and abdominal segments 1, 6, 8, 9 and 10 (Abd 1 – Abd 10).

Tuck (1997) rule out these subfamilies. Absence of a juxtal pouch rules out Erechthiinae. The posterior margin of abdominal tergite I is not thickened, the mid-tibia is not striped, and the uncus is not broad and distinctly bilobed as in Scardiinae.

Larval structure is not particularly illuminating and there are very few detailed descriptions of tineid larvae available for comparison. However, the presence of a full complement of albeit poorly-defined stemmata is unusual if *Xerantica* were to be a tineine



Figs. 13–19. Pupae of *Xerantica tephroclysta*. **13.** Male, lateral view. **14.** Female, lateral view. **15.** Male, abdominal apex, dorsal view. **16.** Female, abdominal apex, dorsal view. **17.** Male, abdominal apex, ventral view. **18.** Female, abdominal apex, ventral view. **19.** Facial plate. Abdominal segment 6 is labelled for orientation purposes.

– the stemmata are usually reduced to one or none in this subfamily. The prothoracic L-group is trisetose, unlike all known Scardiinae in which it is bisetose (Robinson, 1986). The meso- and metathoracic SV group is unisetose (as in Nemapogoninae and

Scardiinae, bisetose in Tineinae); the D1 setae on the anterior abdominal segments are less widely separated than the D2 setae, as in Tineinae and Nemapogoninae. The unisetose SD group on the eighth abdominal segment is a feature otherwise unknown in any tineid, as far as we can discover. On the ninth abdominal segment the L-group is bisetose, as it is in Scardiinae and unlike all Tineinae known (trisetose) except *Tineola*; however, the SV group is unisetose as in Tineinae.

The pupa exhibits one typical feature: the posterior band of dorsal spines usually present on abdominal segments 3–6 in females and 3–7 in males is reduced to a narrow and inconspicuous denticular ridge. This reduction occurs in all Tineinae known, and in most the posterior spine-band is completely absent.

In conclusion, *Xerantica* does not fit comfortably within any currently recognised tineid subfamily with the exception of Tineinae. Even then, several larval characters make it atypical. However, the paucity of comparable, detailed descriptions of early stages of Tineidae make dubious any predictions of taxonomic placement based upon the morphology of the early stages.

The larval feeding of *Xerantica* makes it unusual in the tineine context. Practically all Tineinae of which the biology is known feed on dead animal tissue – a substrate list dominated by keratin or chitin. The only exceptions we can find are the few fungivorous *Monopis* species described and discussed by Powell (1967).

Most Tineidae other than Tineinae feed on lichen or on plant material that is dead, dying or moribund and has been invaded by fungal mycelia, or on the fungus itself (Robinson & Nielsen, 1993). *Xerantica* conforms to the second trophic pattern by stem-boring in moribund *Capparis*, and as such it is a notable exception if, indeed, it is a tineine.

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